

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on January 14, 2003, and the references cited therewith.

Claims 44, 60, 64, 68, 72, 77, 81, and 83 are amended, no claims are canceled, and no claims are added; as a result, claims 44, 45, and 60-83 are now pending in this application.

§102 Rejection of the Claims

Claims 44, 60, 62-64, 66-68, 70-72, 74-77, 79-81, and 83 were rejected under 35 USC § 102(b) as being anticipated by Doan (U.S. 5,278,100).

The rejection stated:

Doan teaches a CVD process for depositing titanium silicide contacts on a semiconductor wafer. The device comprises: a conformal titanium silicide layer (60; Fig. 3) formed by reacting silane and tetradimethylamino titanium to deposit a $TiSi_x$ layer (a layer of titanium alloy) (Doan, col. 2, ll. 57 to col. 3, ll. 64); the titanium silicide layer (60) is coupled to an active area (54) thereby constituting a titanium silicide contact coupled to the layer (60). Doan further teaches annealing to incorporate silicon from the wafer into the deposited layer.

Doan appears to show a film within a contact opening that is a mixture of titanium nitride and titanium silicide (col. 3, lines 12-14). The objective of Doan appears to be forming a metal silicide material with good step coverage. Alloys with materials other than silicon are not mentioned in Doan. Doan does not show a layer of a titanium alloy covering the walls and bottom of a contact hole, wherein the titanium alloy comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, germanium, lead, arsenic and antimony.

In contrast, Applicant's independent claims 44, 60, 64, 68, 72, 77, and 81, as amended, include a layer of a titanium alloy covering the walls and bottom of a contact hole, wherein the titanium alloy comprises titanium and an element selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, germanium, lead, arsenic and antimony.

Further, the film in Doan appears to be formed by combining titanium gas, a titanium organometallic precursor, and silane gas together at the same time (col. 2, lines 62-63). Doan

does not teach a method first using a seed layer that is shown in the present application (among other advantages) to provide a number of possible titanium alloy films with high step coverage.

In contrast, claim 83, as amended, includes an alloy layer of a titanium alloy formed by a method including forming a seed layer supported by a substrate, wherein the seed layer is selected from the group consisting of zinc, cadmium, mercury, aluminum, gallium, indium, tin, germanium, lead, arsenic and antimony by combining a first precursor with a first reducing agent; and forming the titanium alloy layer supported by the substrate by combining a titanium-containing precursor with the seed layer.

Because the Doan reference does not show every element of Applicant's independent claims, a 35 USC § 102(b) rejection is not supported. Reconsideration and withdrawal of the rejection is respectfully requested with respect to Applicant's independent claims 44, 60, 64, 68, 72, 77, 81, and 83. Additionally, reconsideration and withdrawal of the rejection is respectfully requested with respect to the remaining claims that depend therefrom as depending on allowable base claims.

Allowable Subject Matter

Claims 45, 61, 65, 69, 73, 78, and 82 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Applicant acknowledges and thanks the Examiner for the indication of allowability of claims 45, 61, 65, 69, 73, 78, and 82. However, Applicant respectfully submits that independent claims 44, 60, 64, 68, 72, 77, 81, and 83 as amended are in condition for allowance pursuant to arguments presented above. Therefore, Applicant has not rewritten these claims in independent form at this time.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612) 373-6944 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

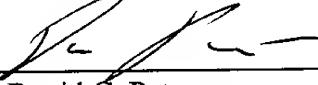
Respectfully submitted,

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Date 3-14-03

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Box AF, Commissioner of Patents, Washington, D.C. 20231, on this 14th day of March, 2003

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